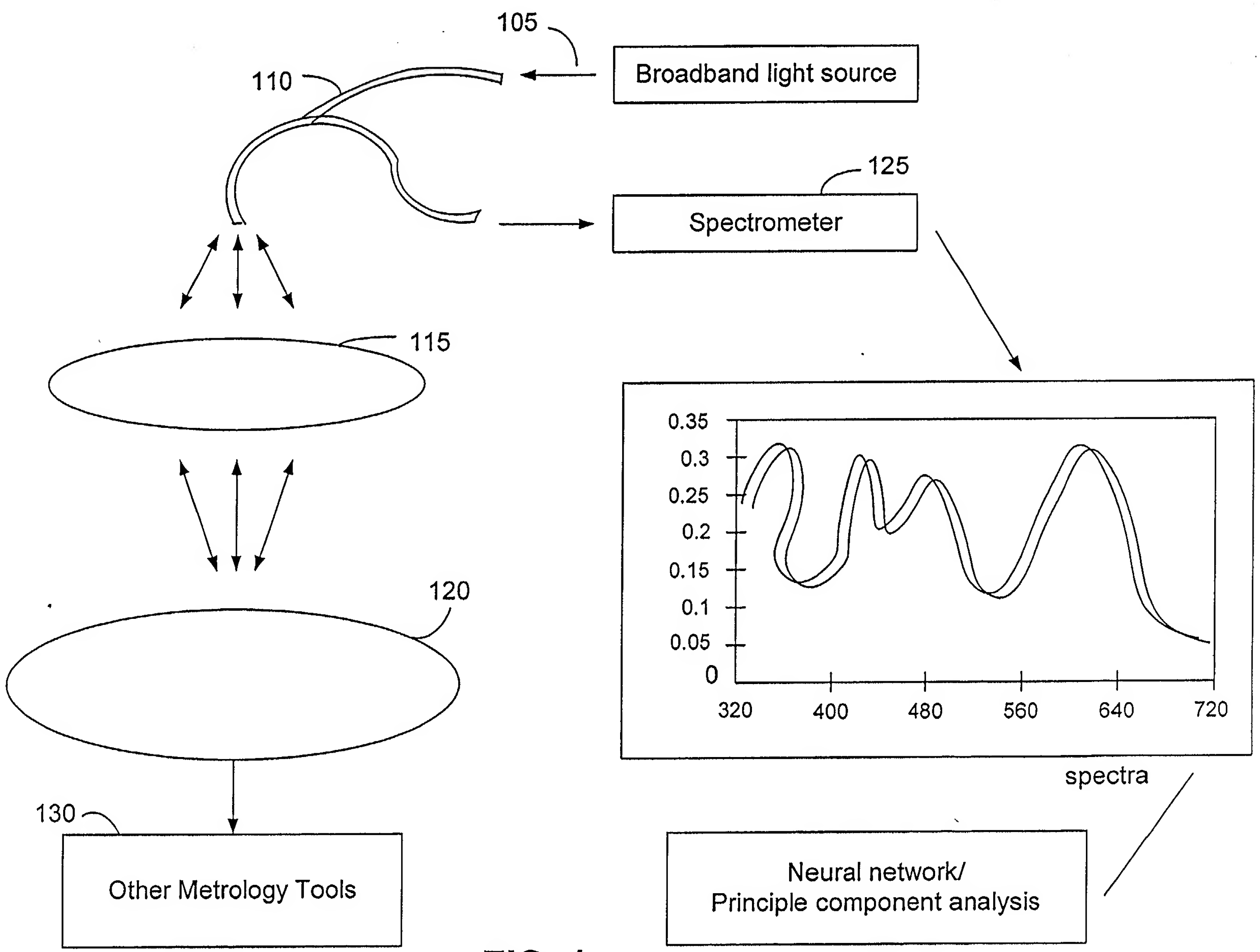

FIG. 1
(Prior Art)

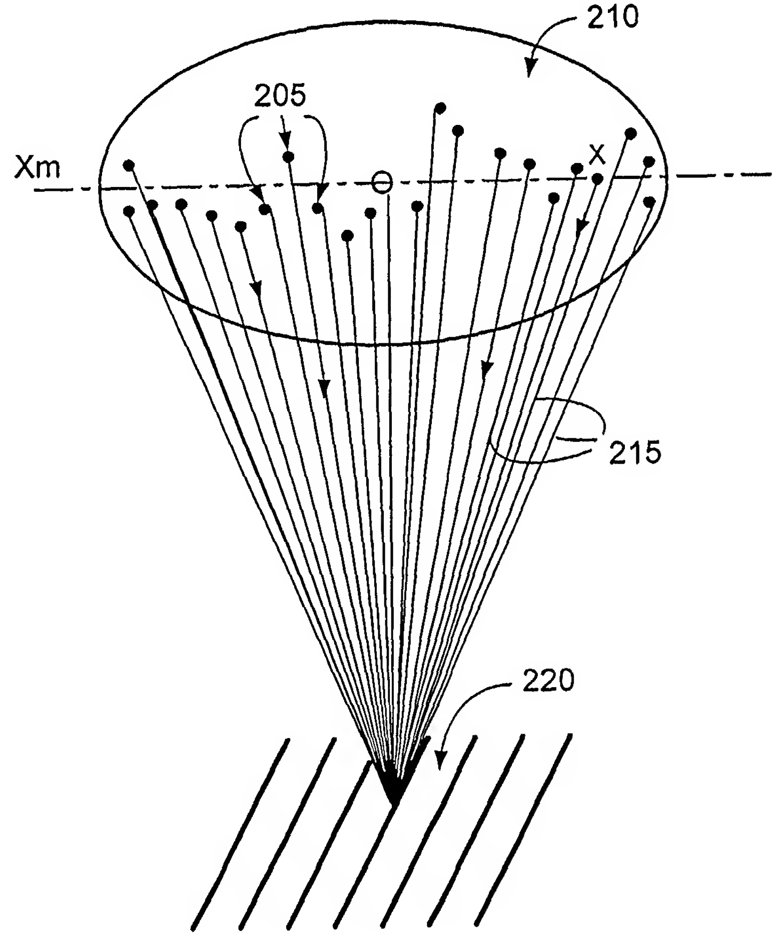

FIG. 2a
(Prior Art)

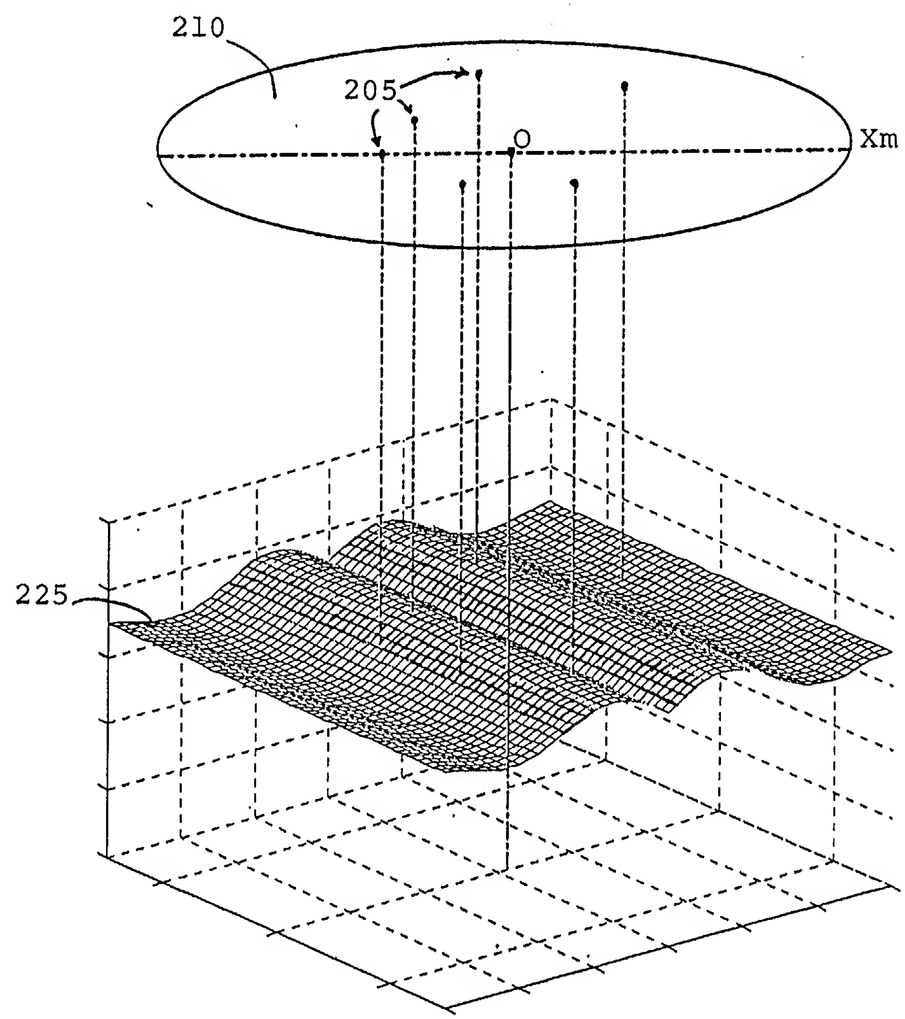

FIG. 2b

(Prior Art)

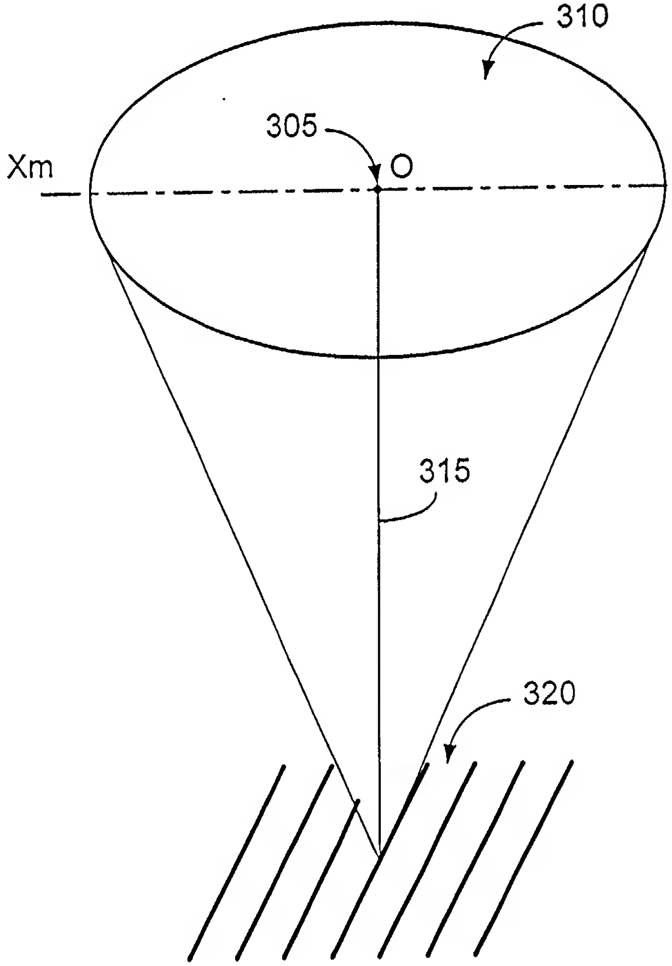

FIG. 3a
(Prior Art)

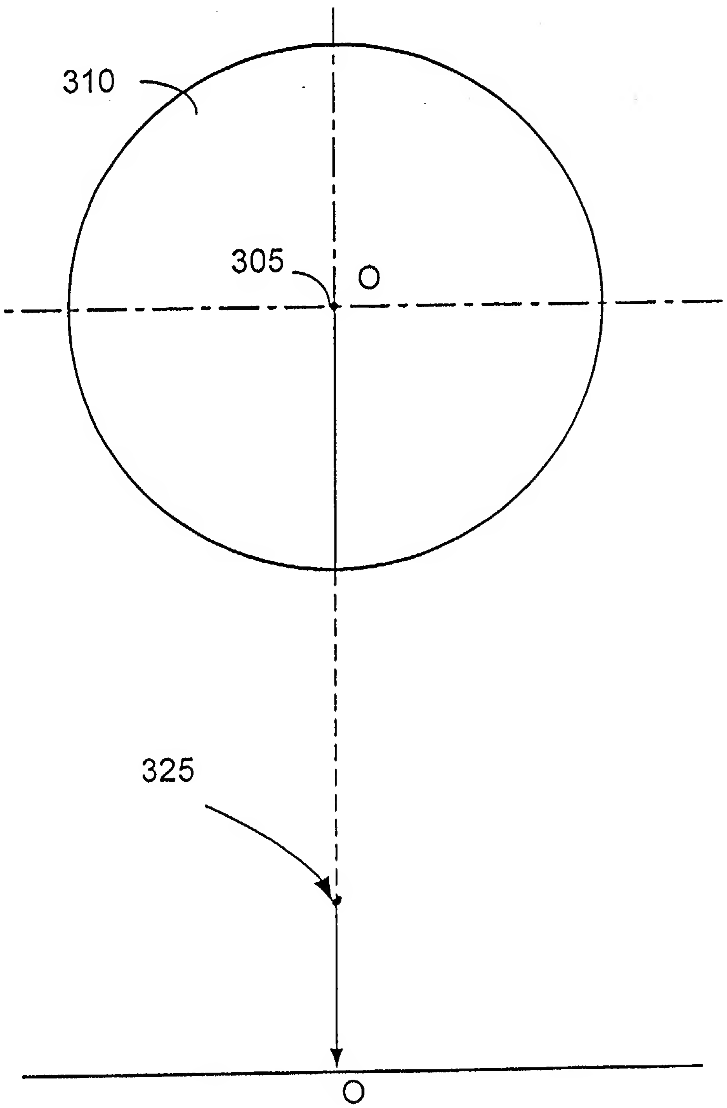

FIG. 3b
(Prior Art)

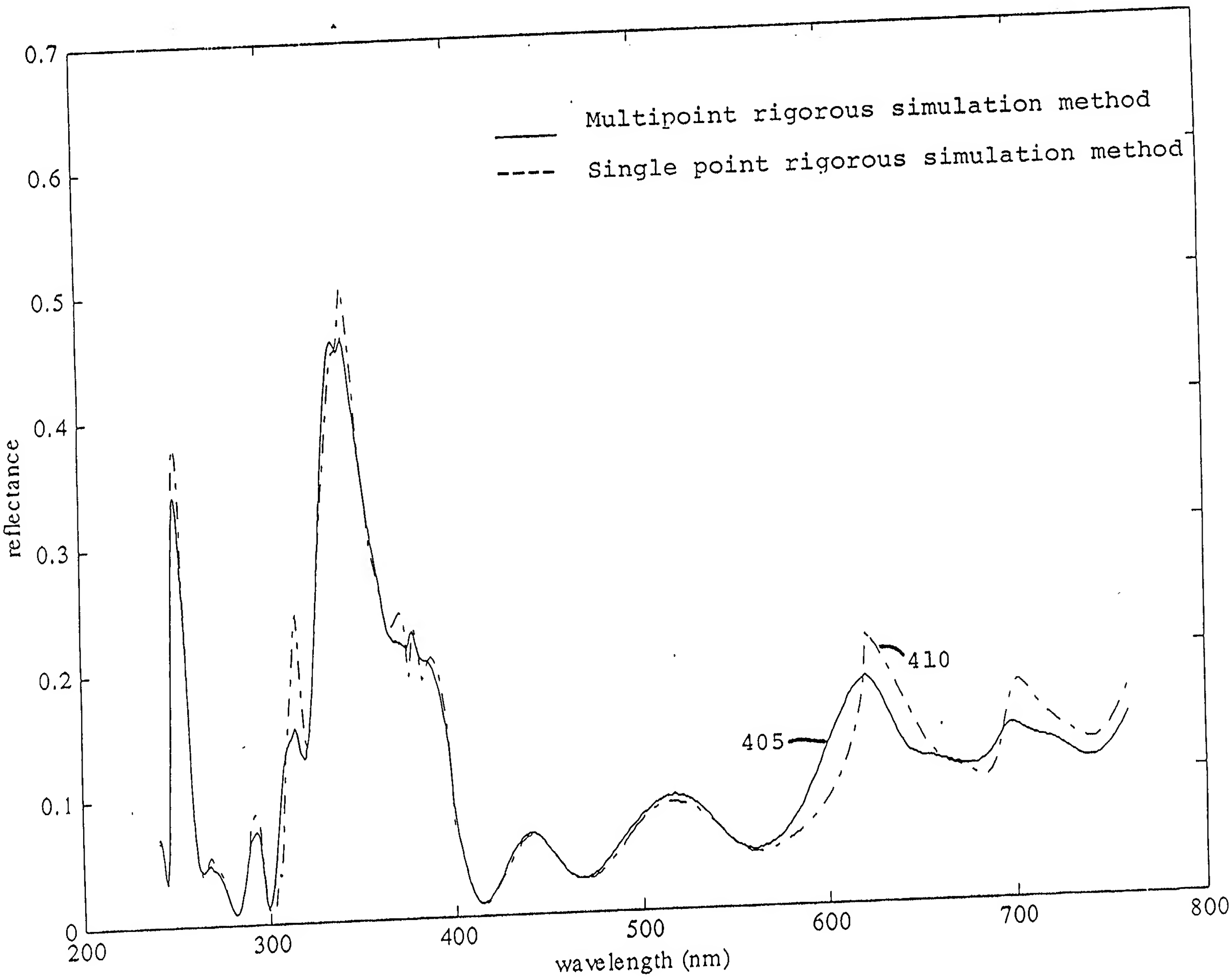
Multipoint rigorous simulation method
Single point rigorous simulation method
reflectance
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
200
300
400
500
600
700
800
wavelength (nm)
405
410

Fig. 4

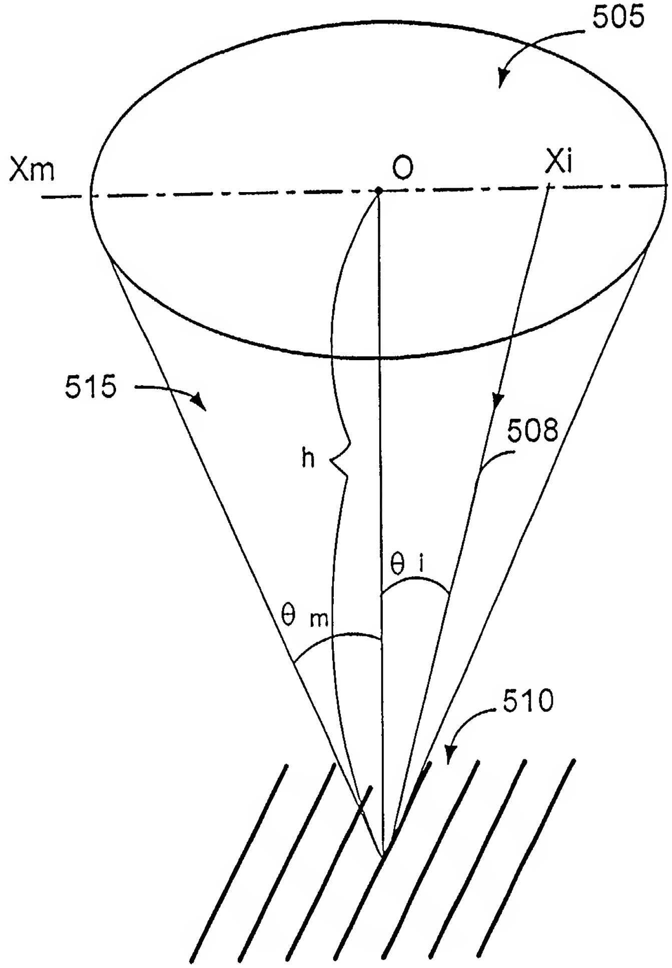
505
Xm
O
Xi
515
508
h
θ i
θ m
510

FIG. 5a

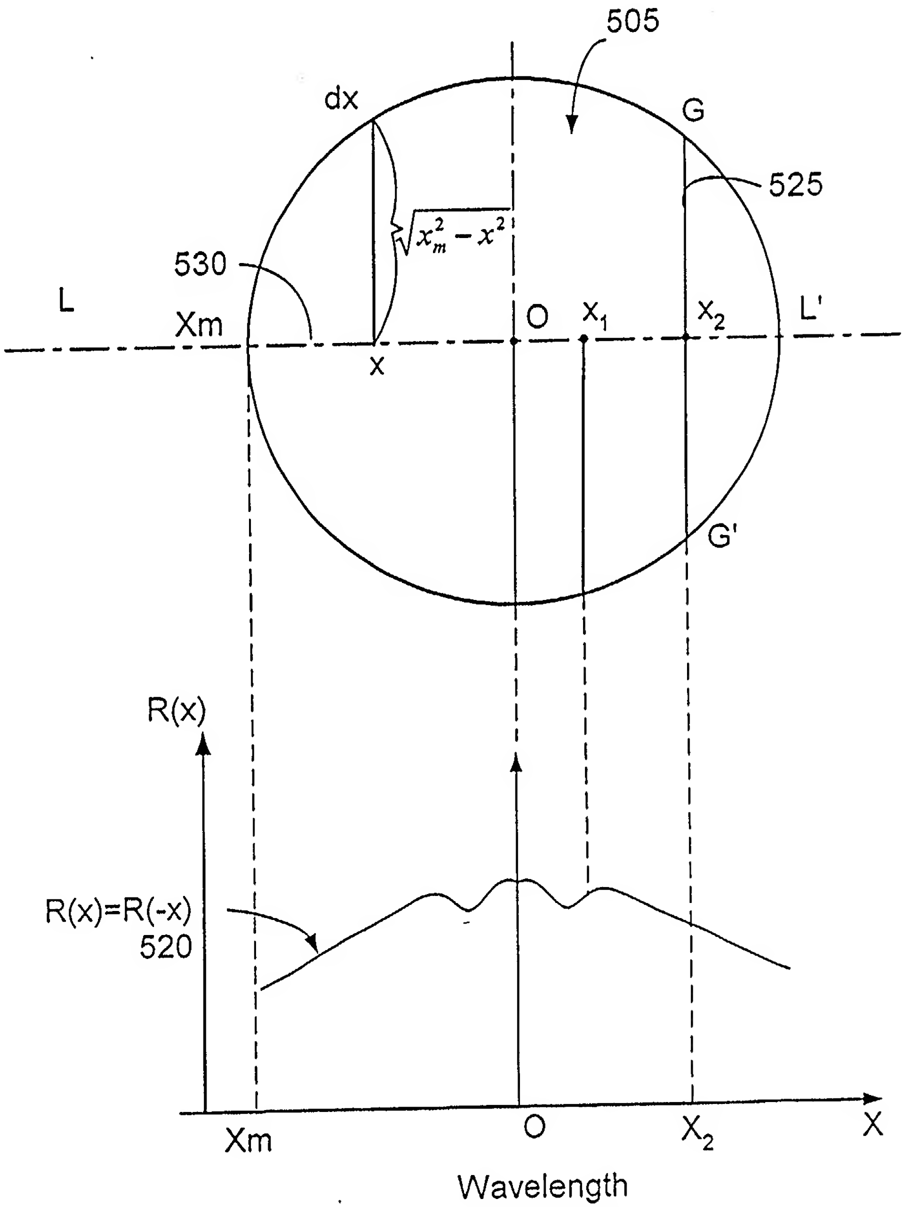
505
dx
G
525
530
L
Xm
O
x_1
x_2
L'
x
$\sqrt{x_m^2 - x^2}$
G'
R(x)
R(x)=R(-x)
520
Xm
O
X_2
X
Wavelength

FIG. 5b

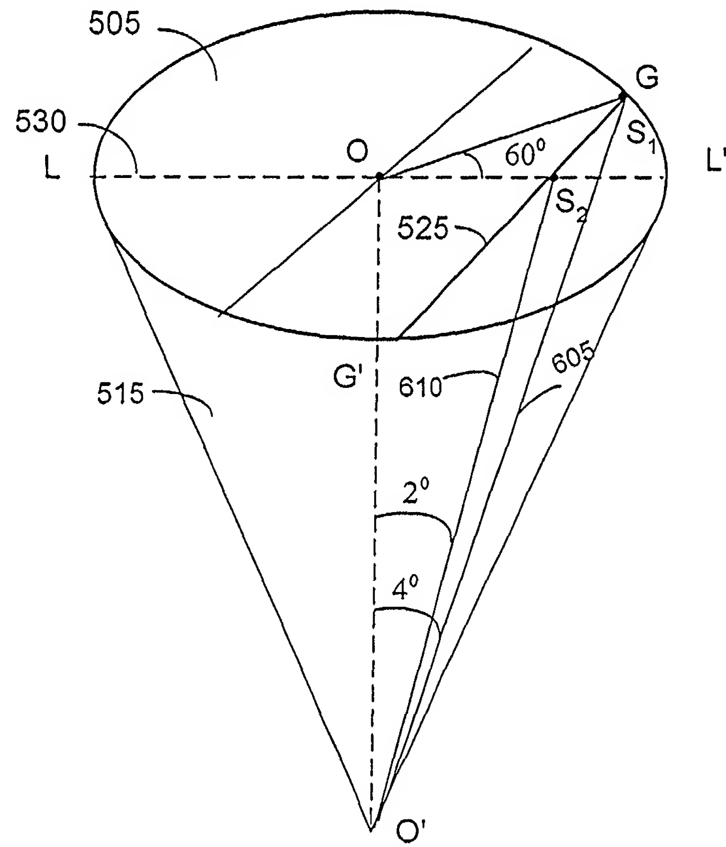

FIG. 6

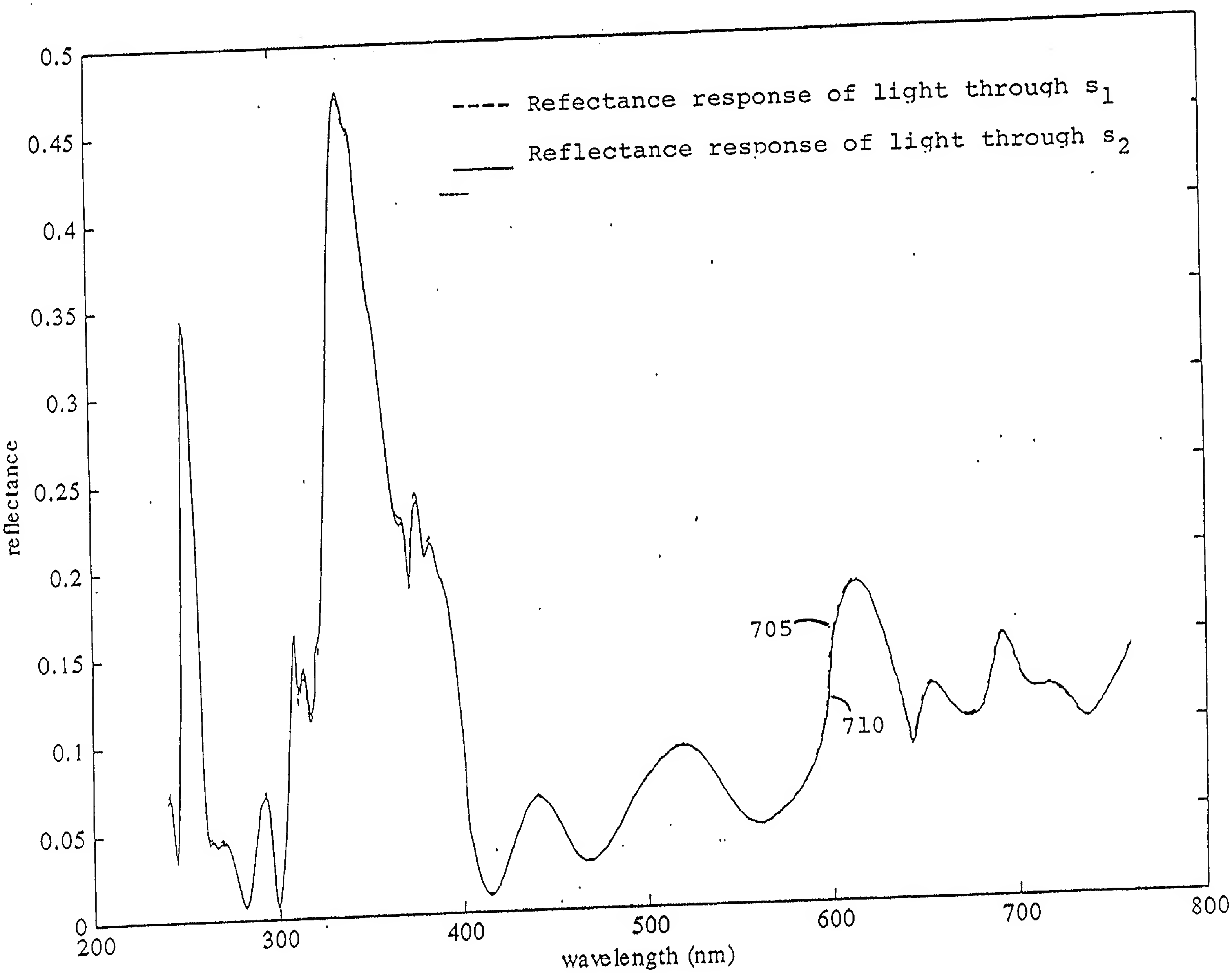
Refectance response of light through s_1
Reflectance response of light through s_2
reflectance
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
200
300
400
500
600
700
800
wavelength (nm)
705
710

Fig. 7

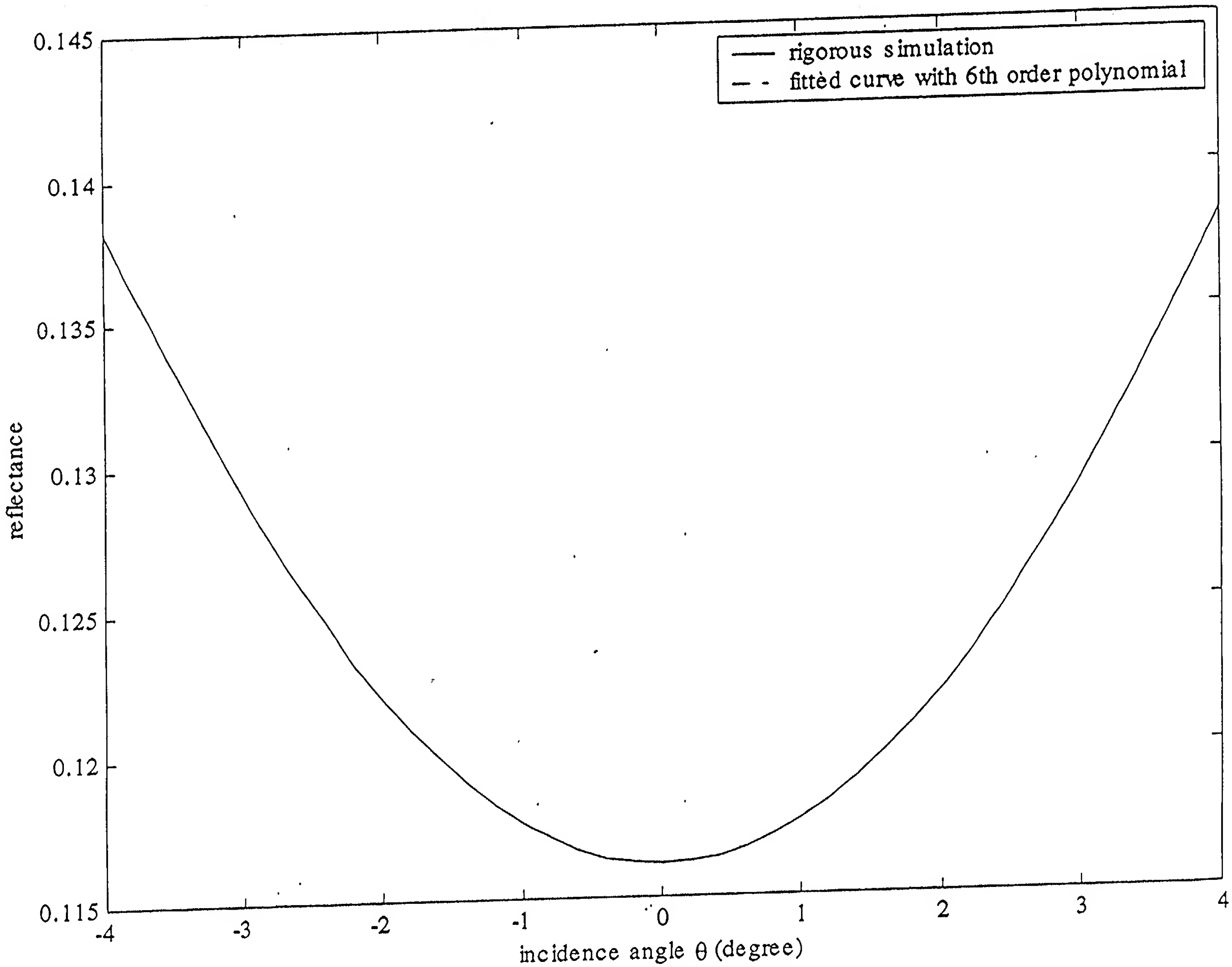
rigorous simulation
fitted curve with 6th order polynomial
reflectance
0.145
0.14
0.135
0.13
0.125
0.12
0.115
-4
-3
-2
-1
0
1
2
3
4
incidence angle θ (degree)

Fig. 8

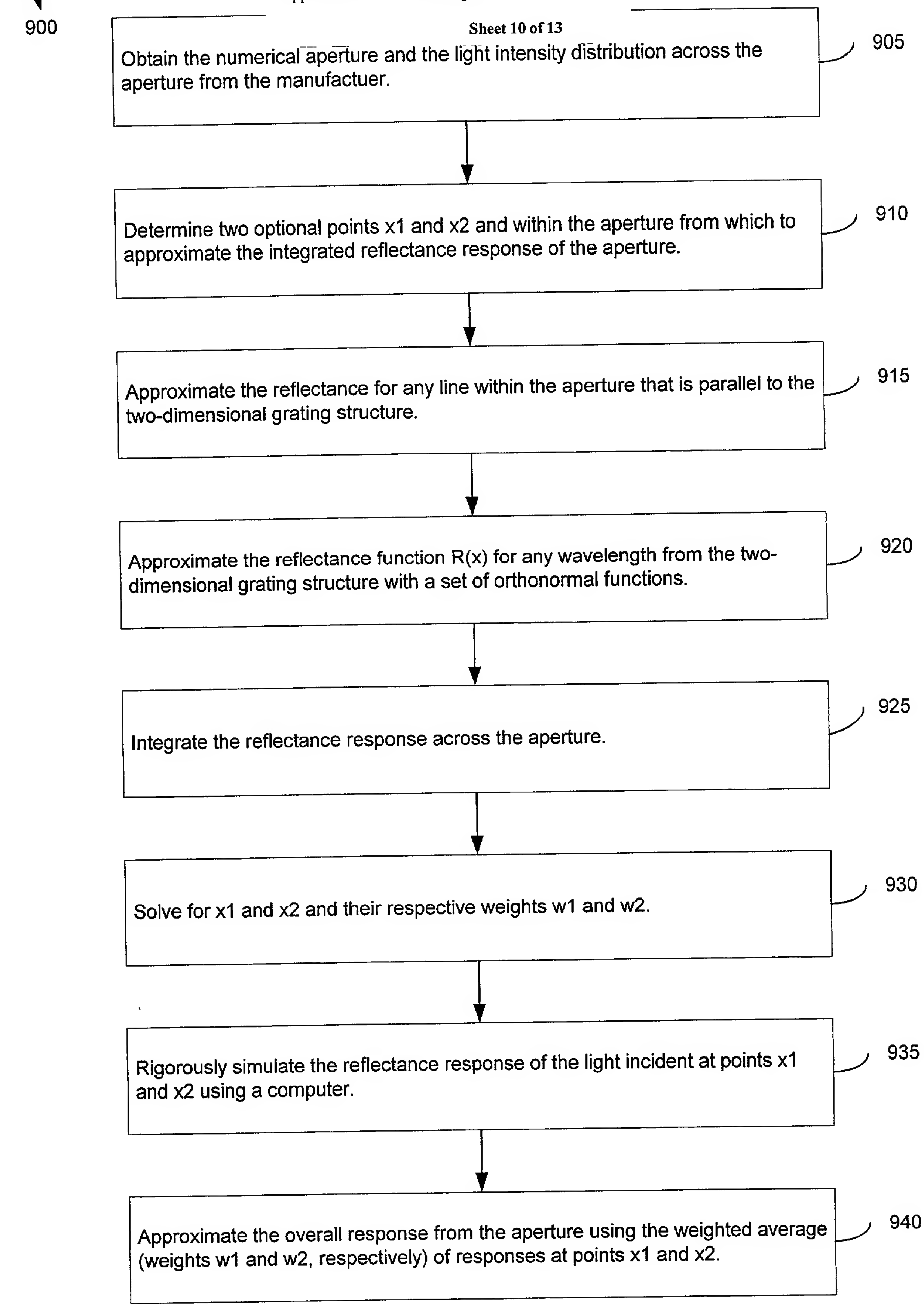
900
Obtain the numerical aperture and the light intensity distribution across the aperture from the manufactuer.
905
Determine two optional points x1 and x2 and within the aperture from which to approximate the integrated reflectance response of the aperture.
910
Approximate the reflectance for any line within the aperture that is parallel to the two-dimensional grating structure.
915
Approximate the reflectance function R(x) for any wavelength from the two-dimensional grating structure with a set of orthonormal functions.
920
Integrate the reflectance response across the aperture.
925
Solve for x1 and x2 and their respective weights w1 and w2.
930
Rigorously simulate the reflectance response of the light incident at points x1 and x2 using a computer.
935
Approximate the overall response from the aperture using the weighted average (weights w1 and w2, respectively) of responses at points x1 and x2.
940

Fig. 9

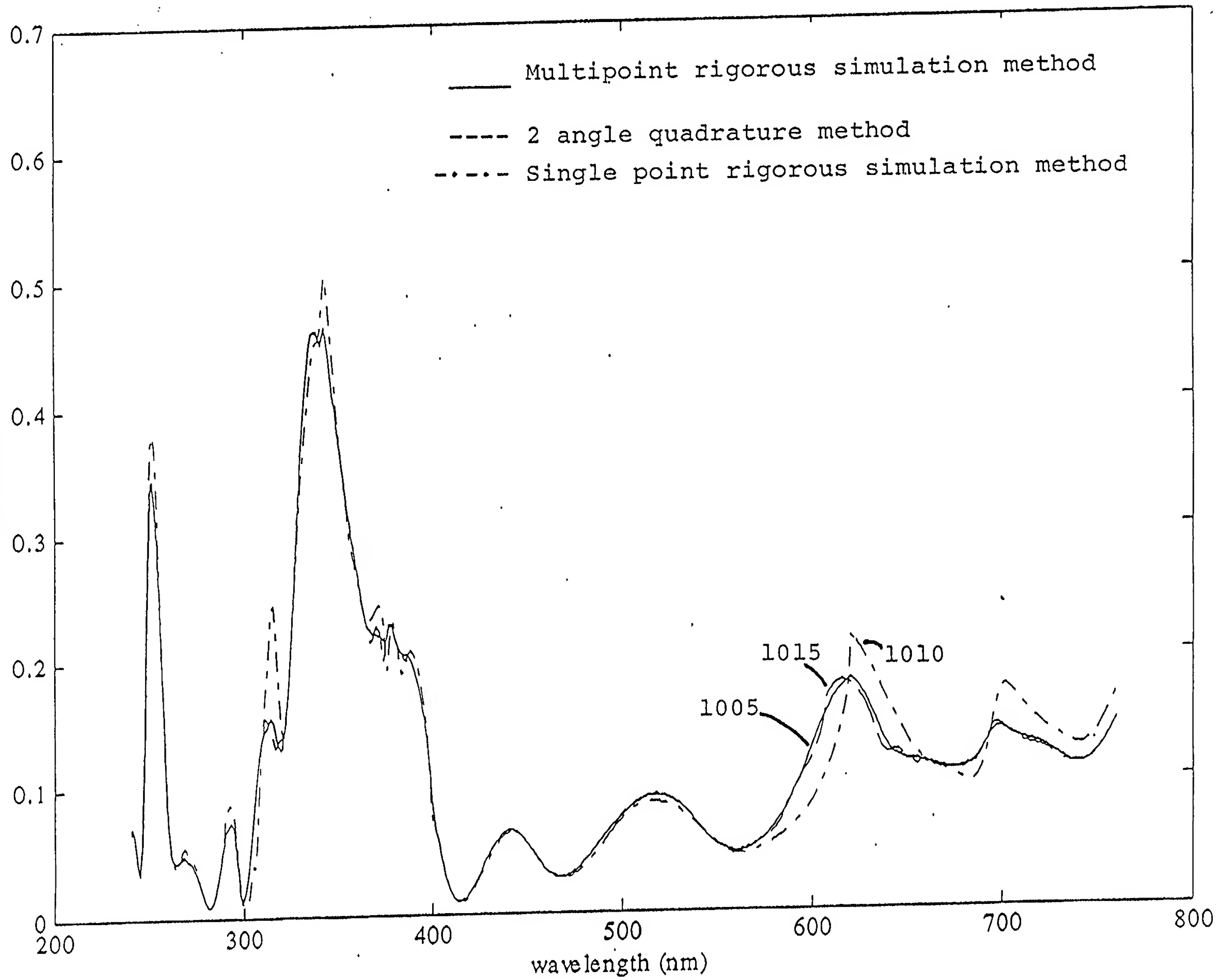
Multipoint rigorous simulation method
2 angle quadrature method
Single point rigorous simulation method
1015
1010
1005
reflectance
wavelength (nm)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
200
300
400
500
600
700
800

Fig. 10

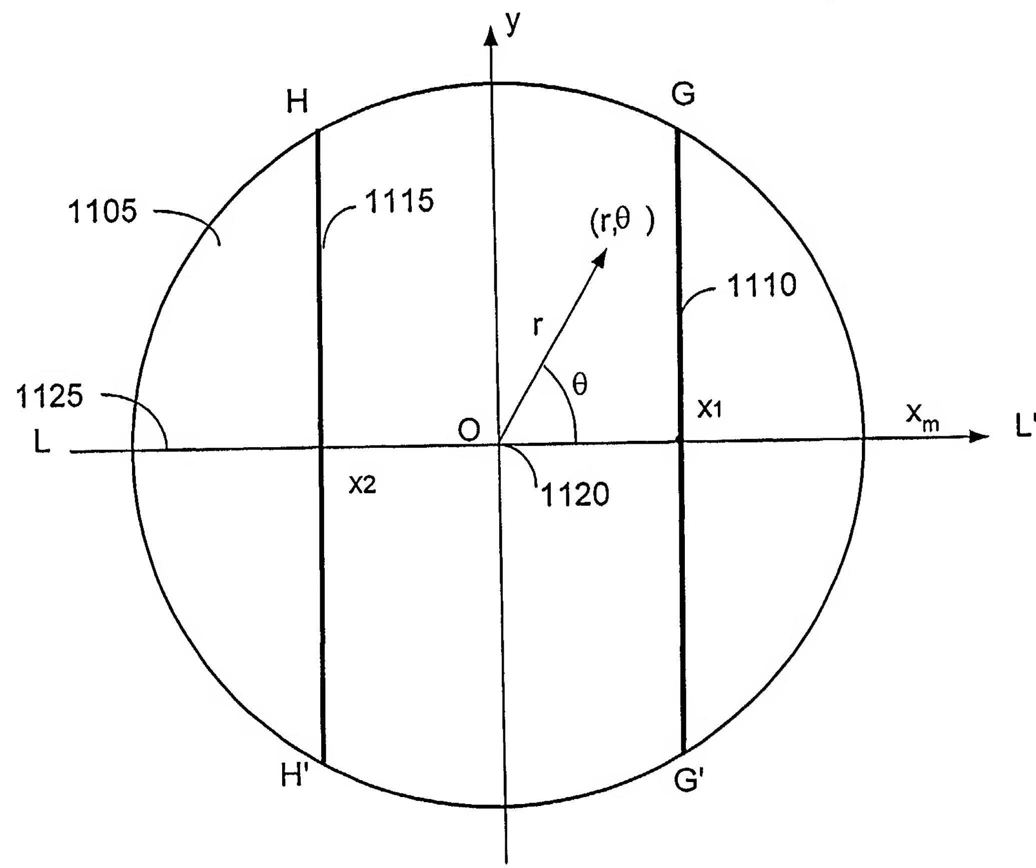

FIG. 11

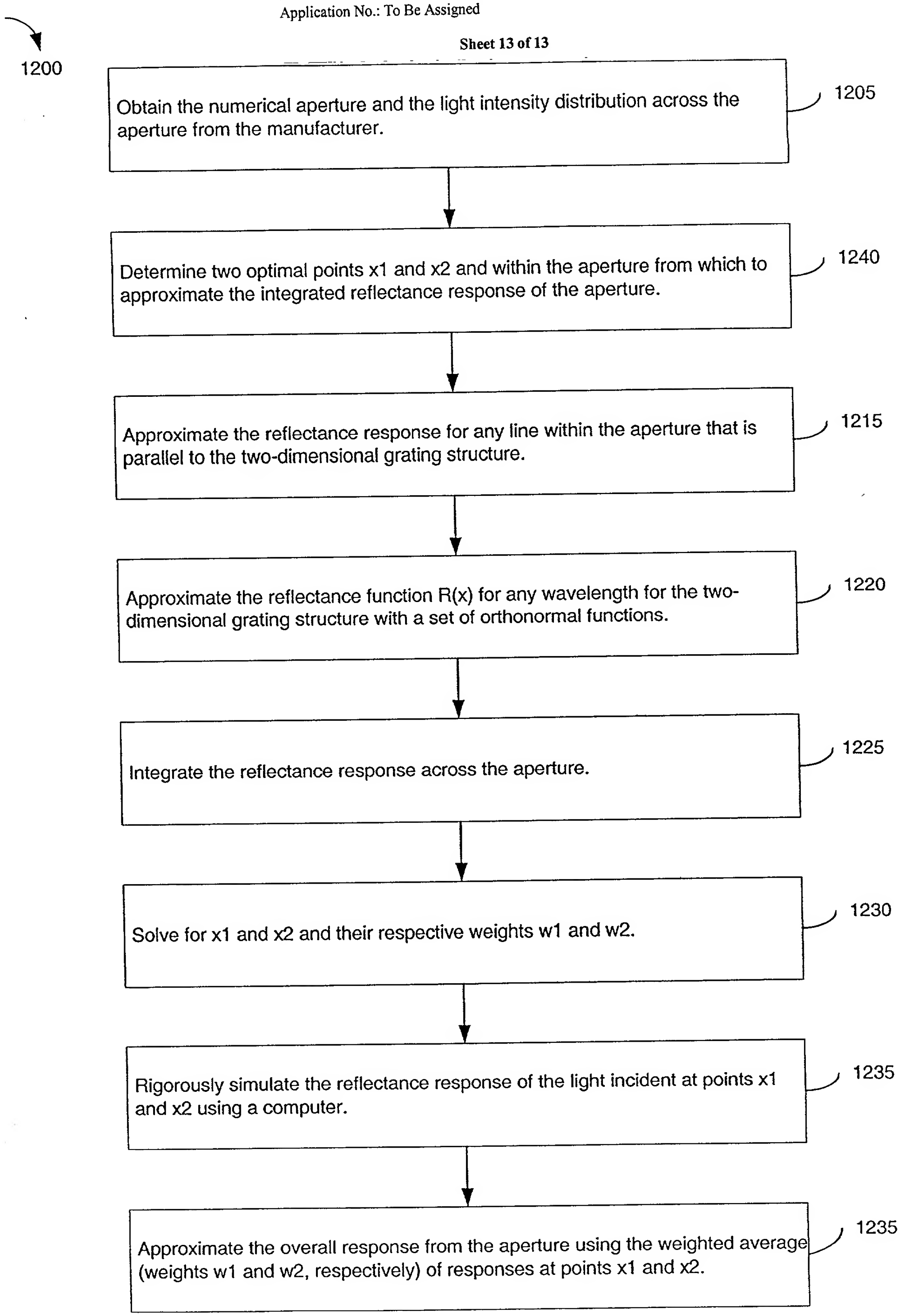
1200
Obtain the numerical aperture and the light intensity distribution across the aperture from the manufacturer.
1205
Determine two optimal points x1 and x2 and within the aperture from which to approximate the integrated reflectance response of the aperture.
1240
Approximate the reflectance response for any line within the aperture that is parallel to the two-dimensional grating structure.
1215
Approximate the reflectance function R(x) for any wavelength for the two-dimensional grating structure with a set of orthonormal functions.
1220
Integrate the reflectance response across the aperture.
1225
Solve for x1 and x2 and their respective weights w1 and w2.
1230
Rigorously simulate the reflectance response of the light incident at points x1 and x2 using a computer.
1235
Approximate the overall response from the aperture using the weighted average (weights w1 and w2, respectively) of responses at points x1 and x2.
1235

Fig. 12